

CLAIMS

We claim:

1. A sacrificial coating material comprising:
at least one inorganic compound, and
5 at least one material modification agent, wherein the sacrificial coating material is
dissolvable in an alkaline-based chemistry or a fluorine-based chemistry.
2. The sacrificial coating material of claim 1, wherein the inorganic compound
comprises a silicon-based compound.
3. The sacrificial coating material of claim 2, wherein the silicon-based compound
10 comprises at least one siloxane compound, at least one silazane polymer,
dimethylsiloxane, diphenylsiloxane, methylphenylsiloxane, at least one silicate
polymer, at least one silsilic acid derivative, and mixtures thereof.
4. The sacrificial coating material of claim 3, wherein the at least one siloxane
15 compound comprises methylsiloxane, methylsilsesquioxane, phenylsiloxane,
phenylsilsesquioxane, methylphenylsiloxane, methylphenylsilsesquioxane or
combinations thereof.
5. The sacrificial coating material of claim 2, wherein the at least one silicon-based
compound comprises at least one hydrogensiloxane polymer having the general
20 formula $(H_{0-1.0}SiO_{1.5-2.0})_x$, at least one hydrogensilsesquioxane polymer having the
formula $(HSiO_{1.5})_x$, where x is greater than about four and derivatives of silsilic acid
or a combination thereof.
6. The sacrificial coating material of claim 2, wherein the at least one silicon-based
compound comprises copolymers of hydrogensilsesquioxane and an
alkoxyhydridosiloxane or hydroxyhydridosiloxane.
7. The sacrificial coating material of claim 2, wherein the silicon-based compound
25 comprises acrylic siloxane polymers, silsesquioxane-based polymers, derivatives of
silici acid, organohydridosiloxane polymers of the general formula
 $(H_{0-1.0}SiO_{1.5-2.0})_n(R_{0-1.0}SiO_{1.5-2.0})_m$, organohydridosilsesquioxane polymers of the

general formula $(\text{HSiO}_{1.5})_n(\text{RSiO}_{1.5})_m$, where m is greater than zero and the sum of n and m is greater than about four and R is alkyl or aryl, and combinations thereof.

8. The sacrificial coating material of claim 7, wherein the organohydridosiloxane polymer comprises methylhydridosiloxanes, ethylhydridosiloxanes, propylhydridosiloxanes, t-butylhydridosiloxanes, phenylhydridosiloxanes and combinations thereof.

9. The sacrificial coating material of claim 7, wherein the silsesquioxane-based polymer comprises methylhydridosilsesquioxanes, ethylhydridosilsesquioxanes, propylhydridosilsesquioxanes, t-butylhydridosilsesquioxanes, phenylhydridosilsesquioxanes, and combinations thereof.

10. The sacrificial coating material of claim 1, wherein the at least one material modification agent comprises at least one porogen, at least one adhesion promoter, at least one densifying agent, at least one leveling agent, at least one high-boiling solvent, at least one catalyst, at least one pH tuning agent, at least one capping agent or at least one replacement solvent.

11. The sacrificial coating material of claim 1, wherein the alkaline-based chemistry comprises an amine-based compound.

12. The sacrificial coating material of claim 11, wherein the amine-based compound comprises a primary amine, a secondary amine, a tertiary amine or a combination thereof.

13. The sacrificial coating material of claim 12, wherein the amine-based compound comprises TMAH.

14. A transparent via fill coating layer comprising the material of claim 1.

15. The transparent via fill coating layer of claim 14, wherein the layer is sacrificial.

16. A layered material, comprising:

the via fill coating layer of claim 14,

an absorbing composition layer, and

a photoresist layer.

17. The layered material of claim 16, wherein the layered material is coupled to a dielectric layer.
18. A method of producing a sacrificial coating material, comprising:
 providing at least one inorganic compound,
 5 providing at least one material modification agent,
 combining the at least one inorganic compound with the at least one material modification agent to form the sacrificial coating material, wherein the sacrificial coating material is dissolvable in an alkaline-based chemistry or a fluorine-based chemistry.
- 10 19. The method of claim 18, wherein the inorganic compound comprises a silicon-based compound.
20. The method of claim 19, wherein the silicon-based compound comprises at least one siloxane compound, at least one silazane polymer, dimethylsiloxane, diphenylsiloxane, methylphenylsiloxane, at least one silicate polymer, at least one
 15 silsilic acid derivative, and mixtures thereof.
21. The method of claim 20, wherein the at least one siloxane compound comprises methylsiloxane, methylsilsesquioxane, phenylsiloxane, phenylsilsesquioxane, methylphenylsiloxane, methylphenylsilsesquioxane or combinations thereof.
22. The method of claim 19, wherein the at least one silicon-based compound comprises
 20 at least one hydrogensiloxane polymer having the general formula $(H_{0-1.0}SiO_{1.5-2.0})_x$, at least one hydrogensilsesquioxane polymer having the formula $(HSiO_{1.5})_x$, where x is greater than about four and derivatives of silsilic acid or a combination thereof.
23. The method of claim 19, wherein the at least one silicon-based compound comprises
 25 copolymers of hydrogensilsesquioxane and an alkoxyhydridosiloxane or hydroxyhydridosiloxane.
24. The method of claim 19, wherein the silicon-based compound comprises acrylic siloxane polymers, silsesquioxane-based polymers, derivatives of silici acid, organohydridosiloxane polymers of the general formula $(H_{0-1.0}SiO_{1.5-2.0})_n(R_{0-1.0}SiO_{1.5-2.0})_m$, organohydridosilsesquioxane polymers of the general formula

$(\text{HSiO}_{1.5})_n(\text{RSiO}_{1.5})_m$, where m is greater than zero and the sum of n and m is greater than about four and R is alkyl or aryl, and combinations thereof.

25. The method of claim 24, wherein the organohydridosiloxane polymer comprises methylhydridosiloxanes, ethylhydridosiloxanes, propylhydridosiloxanes, t-butylhydridosiloxanes, phenylhydridosiloxanes and combinations thereof.
26. The method of claim 24, wherein the silsesquioxane-based polymer comprises methylhydridosilsesquioxanes, ethylhydridosilsesquioxanes, propylhydridosilsesquioxanes, t-butylhydridosilsesquioxanes, phenylhydridosilsesquioxanes, and combinations thereof.
27. The method of claim 18, wherein the at least one material modification agent comprises at least one porogen, at least one adhesion promoter, at least one densifying agent, at least one leveling agent, at least one high-boiling solvent, at least one catalyst, at least one pH tuning agent, at least one capping agent or at least one replacement solvent.
28. The method of claim 18, wherein the alkaline-based chemistry comprises an amine-based compound.
28. The method of claim 28, wherein the amine-based compound comprises a primary amine, a secondary amine, a tertiary amine or a combination thereof.
29. The method of claim 29, wherein the amine-based compound comprises TMAH.
30. A transparent via fill coating layer formed using the method of claim 18.
31. The transparent via fill coating layer of claim 30, wherein the layer is sacrificial.